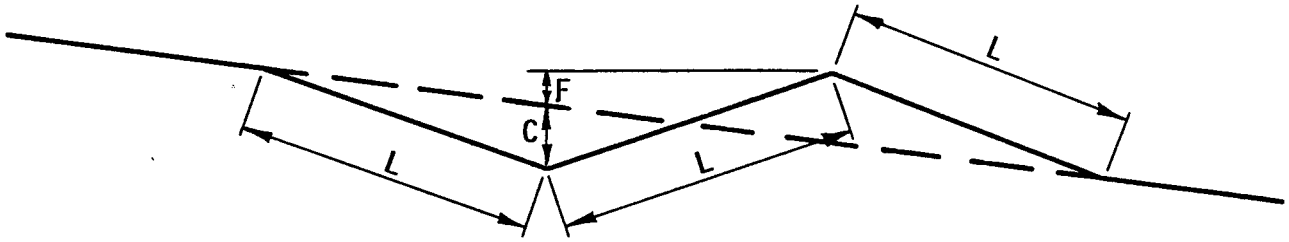
TABLES FOR TERRACE QUANTITIES

EXHIBIT NE 8-3.1

Programs have been developed to determine terrace cut and fill yardage and storage on the IBM Personnel Computer. The following terrace configurations and assumptions were made to develop the program.

1. Broad Base Terraces

   Assumption in the specific program

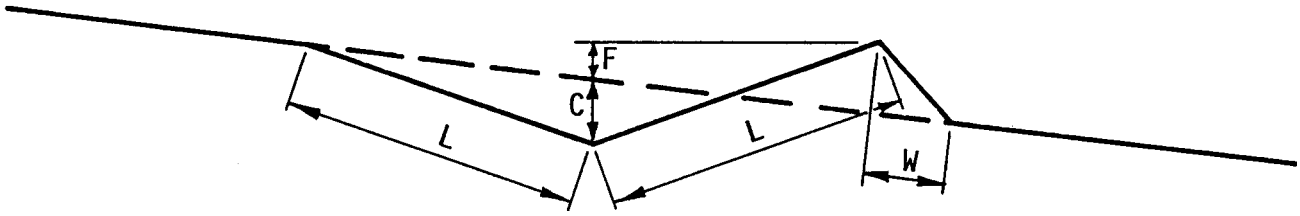


   a. The length of cut is equal to the slope length of the terrace.

   b. The cut and fill are the full height of the terrace (not settled or effective height)

   c. The top of the storage is figured to be .3 ft. lower than the total height.

2. Steep Back Slope Terraces

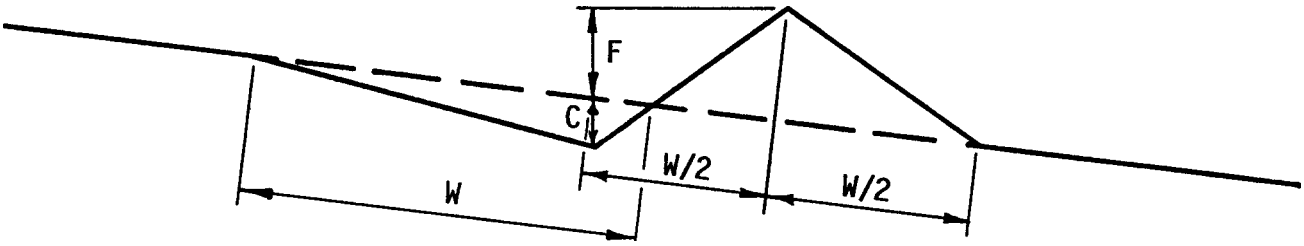


   a. The length of cut is equal to the front slope of the terrace.

   b. The cut and fill are the full height of the terrace (not the settled or the effective height).

   c. The top of the storage is figured to be .3 ft. lower than the total height.

3. Steep Front-Steep Back Slope Terraces (Narrow Base Terraces)



a. The cut slope is the same width as the terrace base.

b. The cut and the fill shown is for the total height of the terrace (not the settled or effective height).

c. The top of the storage is figured to be .5 ft. below the top of the terrace.

Each area office is being furnished with:

Broad base terraces with slope lengths of 14, 16, 18, 20, 24, 28, 32, and 36 feet.

Steep back slope terrace with 15, 18, 20, 24, 30, and 36 feet front slope and a 10 and 12 foot wide back slope, and 20, 24, 30, and 36 feet front slope with a 14 foot wide back slope.

Narrow base terrace -- 12, 14, 16, 18, 20, 22, and 24 feet base width.

Since the entire set is large (1,881 pages), field offices are not expected to have complete sets. Order copies of what you need from your area office.

If you choose to file your tables in a separate notebook, please note the location of the tables below; i.e.: In what book are the tables filed.

Location of Tables _____

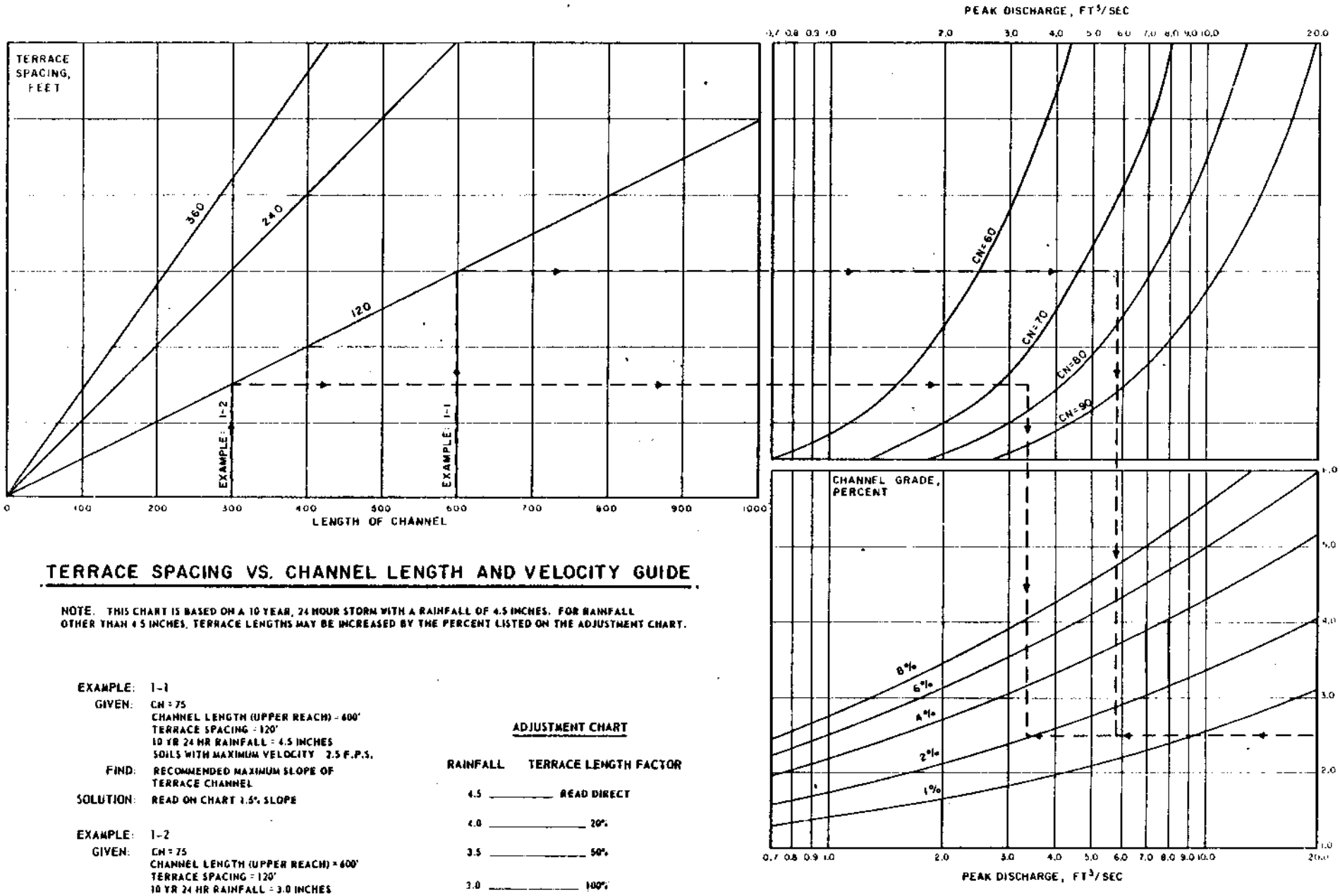
HEAD ABOVE ORIFICE (FT)

ORIFICE SIZE IN.	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
2.00	0.10	0.13	0.15	0.17	0.18	0.20	0.21	0.22	0.23	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.31	0.32	0.33
2.25	0.13	0.16	0.19	0.21	0.23	0.25	0.27	0.28	0.30	0.31	0.32	0.34	0.35	0.36	0.38	0.39	0.40	0.41	0.42
2.50	0.16	0.20	0.23	0.26	0.28	0.31	0.33	0.35	0.37	0.38	0.40	0.42	0.43	0.45	0.46	0.48	0.49	0.50	0.52
2.75	0.20	0.24	0.28	0.31	0.34	0.37	0.40	0.42	0.44	0.46	0.49	0.51	0.52	0.54	0.56	0.58	0.59	0.61	0.63
3.00	0.24	0.29	0.33	0.37	0.41	0.44	0.47	0.50	0.53	0.55	0.58	0.60	0.62	0.65	0.67	0.69	0.71	0.73	0.75
3.25	0.28	0.34	0.39	0.44	0.48	0.52	0.55	0.59	0.62	0.65	0.68	0.71	0.73	0.76	0.78	0.81	0.83	0.85	0.88
3.50	0.32	0.39	0.45	0.51	0.56	0.60	0.64	0.68	0.72	0.75	0.79	0.82	0.85	0.88	0.91	0.94	0.96	0.99	1.01
3.75	0.37	0.45	0.52	0.58	0.64	0.69	0.74	0.78	0.82	0.86	0.90	0.94	0.97	1.01	1.04	1.07	1.11	1.14	1.17
4.00	0.42	0.51	0.59	0.66	0.73	0.78	0.84	0.89	0.94	0.98	1.03	1.07	1.11	1.15	1.19	1.22	1.26	1.29	1.33
4.25	0.47	0.58	0.67	0.75	0.82	0.89	0.95	1.00	1.06	1.11	1.16	1.21	1.25	1.30	1.34	1.38	1.42	1.46	1.50
4.50	0.53	0.65	0.75	0.84	0.92	0.99	1.06	1.13	1.19	1.24	1.30	1.35	1.40	1.45	1.50	1.55	1.59	1.64	1.68
4.75	0.59	0.72	0.84	0.93	1.02	1.11	1.18	1.25	1.32	1.39	1.45	1.51	1.56	1.62	1.67	1.72	1.77	1.82	1.87
5.00	0.66	0.80	0.93	1.04	1.13	1.23	1.31	1.39	1.46	1.54	1.60	1.67	1.73	1.79	1.85	1.91	1.97	2.02	2.07
5.25	0.72	0.88	1.02	1.14	1.25	1.35	1.44	1.53	1.61	1.69	1.77	1.84	1.91	1.98	2.04	2.11	2.17	2.23	2.28
5.50	0.79	0.97	1.12	1.25	1.37	1.48	1.59	1.68	1.77	1.86	1.94	2.02	2.10	2.17	2.24	2.31	2.38	2.44	2.51
5.75	0.87	1.06	1.23	1.37	1.50	1.62	1.73	1.84	1.94	2.03	2.12	2.21	2.29	2.37	2.45	2.53	2.60	2.67	2.74
6.00	0.94	1.16	1.33	1.49	1.63	1.76	1.89	2.00	2.11	2.21	2.31	2.40	2.50	2.58	2.67	2.75	2.83	2.91	2.98
6.25	1.02	1.25	1.45	1.62	1.77	1.91	2.05	2.17	2.29	2.40	2.51	2.61	2.71	2.80	2.89	2.98	3.07	3.15	3.24
6.50	1.11	1.36	1.57	1.75	1.92	2.07	2.21	2.35	2.48	2.60	2.71	2.82	2.93	3.03	3.13	3.23	3.32	3.41	3.50
6.75	1.19	1.46	1.69	1.89	2.07	2.23	2.39	2.53	2.67	2.80	2.92	3.04	3.16	3.27	3.38	3.48	3.58	3.68	3.77
7.00	1.28	1.57	1.82	2.03	2.22	2.40	2.57	2.72	2.87	3.01	3.14	3.27	3.40	3.52	3.63	3.74	3.85	3.96	4.06
7.25	1.38	1.69	1.95	2.18	2.39	2.58	2.75	2.92	3.08	3.23	3.37	3.51	3.64	3.77	3.90	4.02	4.13	4.24	4.35
7.50	1.47	1.80	2.08	2.33	2.55	2.76	2.95	3.13	3.30	3.46	3.61	3.76	3.90	4.04	4.17	4.30	4.42	4.54	4.66
7.75	1.57	1.93	2.23	2.49	2.73	2.94	3.15	3.34	3.52	3.69	3.85	4.01	4.16	4.31	4.45	4.59	4.72	4.85	4.98
8.00	1.68	2.05	2.37	2.65	2.90	3.14	3.35	3.56	3.75	3.93	4.11	4.28	4.44	4.59	4.74	4.89	5.03	5.17	5.30

DISCHARGE RATES OF CIRCULAR ORIFICE IN CFS

EXHIBIT NE 8-5.1
EFM Notice NE-38, 6/88

NE-8-102.1



TERRACE SPACING VS. CHANNEL LENGTH AND VELOCITY GUIDE

NOTE. THIS CHART IS BASED ON A 10 YEAR, 24 HOUR STORM WITH A RAINFALL OF 4.5 INCHES. FOR RAINFALL OTHER THAN 4.5 INCHES, TERRACE LENGTHS MAY BE INCREASED BY THE PERCENT LISTED ON THE ADJUSTMENT CHART.

EXAMPLE: 1-1
GIVEN: CN = 75
CHANNEL LENGTH (UPPER REACH) = 600'
TERRACE SPACING = 120'
10 YR 24 HR RAINFALL = 4.5 INCHES
SOILS WITH MAXIMUM VELOCITY 2.5 F.P.S.
FIND: RECOMMENDED MAXIMUM SLOPE OF TERRACE CHANNEL
SOLUTION: READ ON CHART 1.5% SLOPE

EXAMPLE: 1-2
GIVEN: CN = 75
CHANNEL LENGTH (UPPER REACH) = 600'
TERRACE SPACING = 120'
10 YR 24 HR RAINFALL = 3.0 INCHES
SOILS WITH MAXIMUM VELOCITY = 2.5 F.P.S.
FIND: RECOMMENDED MAXIMUM SLOPE OF TERRACE CHANNEL
SOLUTION. READ ON CHART 2.1% SLOPE

ADJUSTMENT CHART

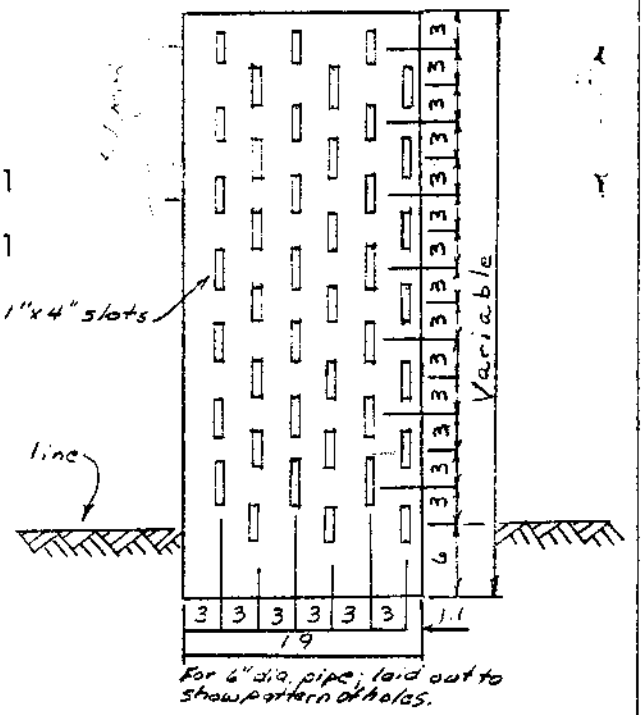
RAINFALL	TERRACE LENGTH FACTOR
4.5	READ DIRECT
4.0	20%
3.5	50%
3.0	100%

EXHIBIT 8-7
EFM-Notice 17 4/78

UNDERGROUND OUTLET
RISER DESIGN
Density = .22

Note: For 8"-dia. riser, add 2 additional vertical rows.
For 10"-dia. riser, add 4 additional vertical rows.
For 12"-dia. riser, add 6 additional vertical rows.

Capacity of riser @ 1.00 ft. head must exceed flow through orifice.



Capacity in CFS

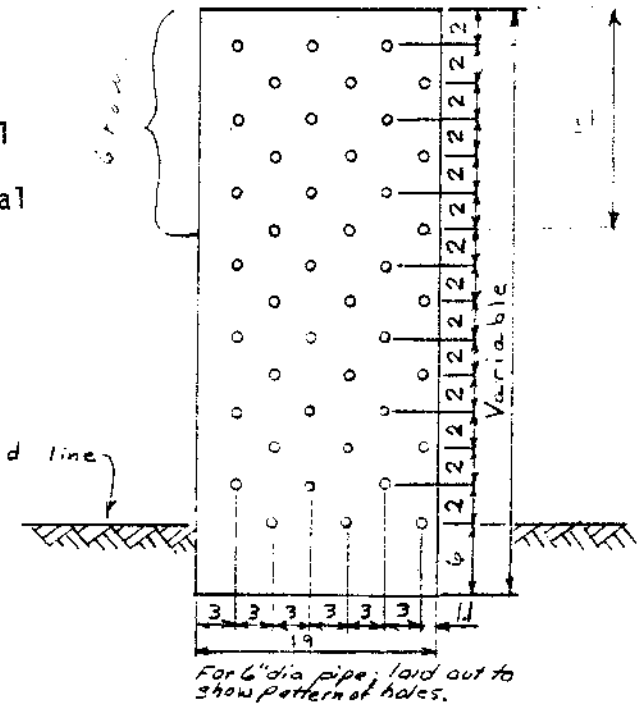
Head Feet	6" dia.	8" dia.	10" dia.	12" dia.
.25	.09	.13	.16	.19
.50	.32	.44	.54	.66
.75	.63	.84	1.03	1.27
1.00	1.00	1.33	1.66	2.00
1.25	1.41	1.89	2.36	2.84
1.50	1.88	2.51	3.13	3.76
1.75	2.38	3.18	3.97	4.77
2.00	2.93	3.91	4.88	5.86
2.25	3.51	4.68	5.85	7.02
2.50	4.12	5.49	6.87	8.24
2.75	4.76	6.35	7.94	9.53
3.00	5.44	7.26	9.07	10.88
3.25				
3.50				
3.75				
4.00				

EXHIBIT 8-8
EFM Notice 24 10/80

UNDERGROUND OUTLET
RISER DESIGN

Note: For 8"-dia. riser, add 2 additional vertical rows.
For 10"-dia. riser, add 4 additional vertical rows.

Capacity of riser @ 1.00 ft. head must exceed flow through orifice.



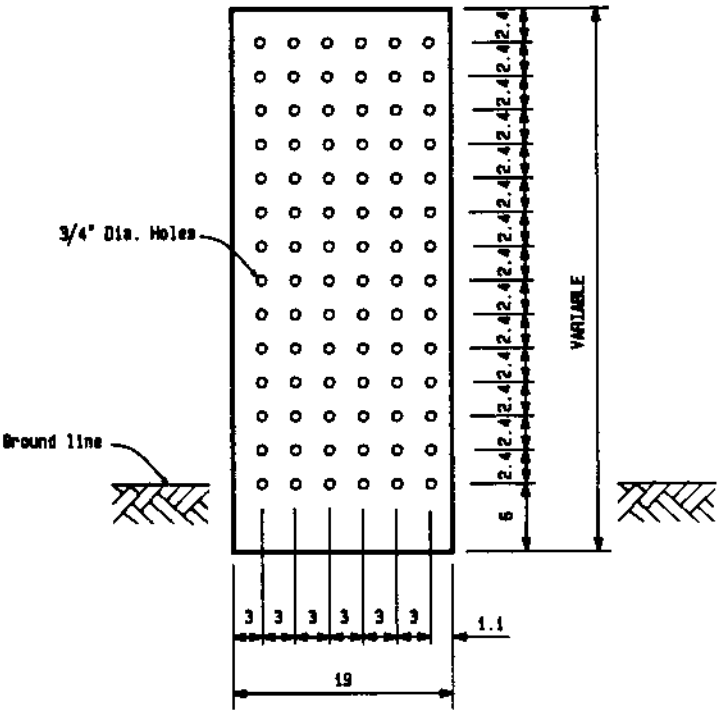
Density .036 Capacity in CFS Density = .06

Head Feet	3/4"dia. holes			1" dia. holes		
	6" dia.	8" dia.	10" dia.	6" dia.	8" dia.	10" dia.
.25	.03	.04	.05	.06	.07	.09
.50	.08	.10	.13	.13	.18	.22
.75	.13	.18	.22	.24	.31	.39
1.00	.20	.26	.33	.35	.47	.59
1.25	.27	.36	.45	.48	.64	.81
1.50	.35	.47	.59	.63	.83	1.05
1.75	.44	.59	.73	.78	1.04	1.31
2.00	.53	.71	.89	.95	1.26	1.58
2.25	.63	.84	1.06	1.13	1.50	1.88
2.50	.74	.98	1.23	1.31	1.74	2.19
2.75	.85	1.13	1.42	1.51	2.01	2.52
3.00	.96	1.28	1.61	1.71	2.28	2.86
3.25	1.08	1.44	1.81	1.93	2.56	3.22
3.50	1.21	1.61	2.09	2.15	2.86	3.59
3.75	1.34	1.78	2.23	2.38	3.16	3.97
4.00	1.47	1.95	2.54	2.61	3.48	4.36

EXHIBIT 8-8
EFM Notice 24 10/80

UNDERGROUND OUTLET
HICKENBOTTOM PREFAB RISER

Capacity of riser @ 1.00 ft. head must exceed flow through orifice.



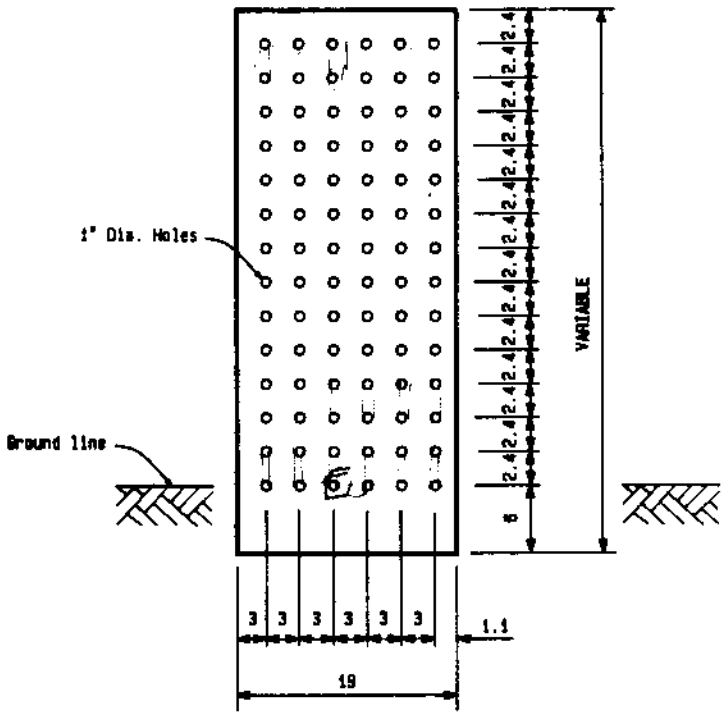
Example of 6" Dia. pipe laid out to show pattern of holes.

3/4 INCH DIAMETER HOLES
CAPACITY IN CFS

HEAD FEET	6 IN DIAM	8 IN DIAM	10 IN DIAM	12 IN DIAM
0.25	0.06	0.09	0.11	0.13
0.50	0.14	0.19	0.23	0.28
0.75	0.23	0.31	0.38	0.46
1.00	0.33	0.44	0.55	0.66
1.25	0.47	0.62	0.78	0.93
1.50	0.60	0.80	1.00	1.20
1.75	0.74	0.99	1.23	1.48
2.00	0.89	1.19	1.48	1.78
2.25	1.07	1.42	1.78	2.13
2.50	1.24	1.65	2.07	2.48
2.75	1.42	1.89	2.36	2.84
3.00	1.60	2.14	2.67	3.21
3.25	1.81	2.42	3.02	3.63
3.50	2.02	2.69	3.37	4.04
3.75	2.23	2.97	3.71	4.46
4.00	2.44	3.26	4.07	4.89
4.25	2.68	3.58	4.47	5.36
4.50	2.92	3.89	4.86	5.83
4.75	3.15	4.20	5.25	6.30
5.00	3.39	4.52	5.65	6.78
5.25	3.66	4.88	6.10	7.31
5.50	3.92	5.22	6.53	7.83
5.75	4.18	5.57	6.96	8.35
6.00	4.44	5.92	7.40	8.88

UNDERGROUND OUTLET
HICKENBOTTOM PREFAB RISER

Capacity of riser @ 1.00 ft. head must exceed flow through orifice.



Example of 6" Dia. pipe laid out to show pattern of holes.

1 INCH DIAMETER HOLES
CAPACITY IN CFS

HEAD FEET	6 IN DIAM	8 IN DIAM	10 IN DIAM	12 IN DIAM
0.25	0.11	0.15	0.19	0.23
0.50	0.25	0.33	0.41	0.49
0.75	0.41	0.54	0.68	0.81
1.00	0.59	0.79	0.98	1.18
1.25	0.83	1.11	1.38	1.66
1.50	1.07	1.42	1.78	2.13
1.75	1.32	1.76	2.20	2.63
2.00	1.58	2.11	2.64	3.16
2.25	1.90	2.53	3.16	3.79
2.50	2.20	2.94	3.67	4.41
2.75	2.52	3.36	4.20	5.04
3.00	2.85	3.80	4.75	5.70
3.25	3.22	4.30	5.37	6.45
3.50	3.59	4.79	5.98	7.18
3.75	3.96	5.28	6.60	7.92
4.00	4.34	5.79	7.24	8.69
4.25	4.77	6.36	7.95	9.54
4.50	5.18	6.91	8.64	10.37
4.75	5.60	7.47	9.34	11.21
5.00	6.03	8.04	10.05	12.06
5.25	6.50	8.67	10.84	13.00
5.50	6.96	9.28	11.60	13.92
5.75	7.42	9.90	12.37	14.85
6.00	7.89	10.52	13.16	15.79

EXHIBIT 8-8
EFM Notice 38 6/88